T286 12MHz Main Board

User's Manual

Trademark Acknowledgements

2nd Edition, 1990

IBM and PC/AT are registered trademarks of International Business Machines Corp.

Intel is a registered trademark of Intel Corporation.

MS-DOS is a registered trademark of Microsoft Corporation.

TI is a registered trademark of Texas Instruments.

Phoenix 286 ROM BIOS PLUS is the product of Phoenix Technologies, Ltd.

Award Software, Inc. and Modular BIOS are trademarks of Award Software, Inc.

All other trademarks are the property of their respective owners.

T286 12MHz Main Board User's Manual

Table of Contents

1. **Introduction** 2

1.1. Specifications: 2

1.1.1. CPU 2

1.1.2. 80287 co-processor (optional) 2

1.1.3. RAM 2

1.1.4. Expansion slot 2

1.1.5. PC/AT compatible and baby AT size 2

1.1.6. On board POWER GOOD generator 2

1.1.7. Licensed BIOS 2

1.1.8. DMA Controller 3

1.1.9. Interrupt Controller 3

1.1.10. Timer 3

1.1.11. Real Time Clock (RTC) 3

1.1.12. Miscellaneous 3

2. **Jumper Settings** 4

2.1. ROM type (JP1) 4

2.2. RAM type (JP4) 5

2.3. Display adapter type (JP2) 5

T286 12MHz Main Board User's Manual

Table of Contents

2.4. 80287 co-processor clock frequency (JP13)..... 5

2.5. EALE (Early Address Latch Enable) selection (JP16)..... 6

2.6. I/O wait state setting (JP15)..... 6

2.7. RAM speed selection (JP5)..... 6

2.8. Parity check enable/disable (JP44)..... 6

2.9. Memory wait state setting (JP17)..... 7

2.10. Keyboard controller clock frequency (JP40)..... 7

3. Memory Configuration and Installation..... 8

3.1. The memory layout 8

3.2. The memory configuration..... 9

4. Connectors..... 10

4.1. TURBO LED connector..... 10

4.2. RESET connector..... 10

4.3. TURBO connector..... 10

4.4. Speaker connector..... 11

4.5. Keylock and power LED connector..... 11

4.6. Keyboard connector..... 11

4.7. Power connector 1..... 12

T286 12MHz Main Board User's Manual

Table of Contents

4.8. Expansion slots 12

4.8.1. 62 pin card-edge socket pin assignment (P3 - P9) 12

4.8.2. 36 pin card-edge socket pin assignment (P3 - P8) 13

5. Phoenix BIOS setup procedures 15

5.1. Setting the Time 17

5.2. Setting the Date 17

5.3. Configuring diskettes 17

5.4. Configuring a diskless workstation 18

5.5. External diskettes 18

5.6. Configuring hard disk 1 18

5.7. Configuring hard disk 2 21

5.8. Configuring Base Memory 22

5.9. Configuring Extended Memory 22

5.10. Configuring display 23

5.11. Configuring keyboard 23

5.12. Setting CPU speed 24

6. Award BIOS setup procedures 25

6.1. DATE 27

Table of Contents

6.2. TIME. 27

6.3. DISKETTE 1. 27

6.4. DISKETTE 2. 27

6.5. DISK 1. 28

6.6. DISK 2. 30

6.7. VIDEO. 30

6.8. BASE MEMORY. 30

6.9. AMOUNT OF EXTENDED MEMORY. 31

6.10. ERROR HALT. 32

6.11. SPEED SELECT. 32

6.12. SETUP PROGRAM DEFAULT SETTING. 33

7. Appendices. 34

7.1. Installation of Award Modular BIOS ROMed Disk Caching Extension. . . 34

Quick Setup Section

If you are already familiar with the technical know-hows of a 286 machines, and could not wait to waste time to flip through the pages, this section is a quick and easy way to setup your 286 system.

If you have purchased the board without any RAM, and that you would like to install the RAM now, please read Section 3 - Memory Configuration and Installation carefully before you start.

Factory settings

The 286 board comes with the following factory settings:

Functions	Jumper	Status
Monochrome Graphics Card	JP2	Open

If you plug in a monochrome graphics card, and make the necessary connections, you still have to software setup the board via BIOS :

Boot up the system after your have made all the connections and attached all the peripherals, and go to the related setup procedures section - Time & Date, type of floppy drive (A: or B:, 360KB/760KB/1.2MB/1.44MB), type of hard disk, video type, base and extended memory, and CPU speed select.

After you have setup the board, reboot and your system should function properly.

Note : Set jumper JP2 which allows you to select the video type. If you are using a VGA card which is backward compatible with EGA, Monochrome Graphics, CGA, there is no effect if you select JP2 closed or open, because the BIOS will detect the monochrome graphics mode even if yours is a VGA card. It will see it as another monochrome graphics card even if yours is a VGA.

You will, however, see the difference if yours is a VGA-only card.

1. Introduction

The 286 system board is fully compatible with the PC/AT. All software which are available for the PC/AT can be run on a 286 based system without modification.

1.1. Specifications

1.1.1. CPU

80286 microprocessor - 12 MHz or 8 MHz selectable, changeable by TURBO switch or by keyboard.

1.1.2. 80287 co-processor (optional).

1.1.3. RAM

512KB, 640KB, 1MB, 2MB, 2.128MB, 2.5MB, 4MB optional. 0 wait state for 100ns DRAMs.

1.1.4. Expansion slot

Six 16-bit bus slot and one 8-bit bus slot, 8 MHz bus clock frequency is maintained by the dynamic clock switching circuit.

Connectors for RESET switch, TURBO switch, TURBO LED, KEYLOCK, POWER LED and SPEAKER are provided.

1.1.5. PC/AT compatible and baby AT size.

1.1.6. On board POWER GOOD generator

The POWER GOOD signal generated by some power supply may not meet the specification, with this on board **POWER GOOD generator** such problem can be eliminated.

1.1.7. Licensed BIOS

Standard 80286 ROM BIOS features include :

- all AT-compatible BIOS functions,
- POST (Power On Self Test) routines, and
- the SETUP utility in ROM.

1.1.8. DMA Controller

There are two 8237A compatible DMAC's and a 74LS612 compatible page register integrated into AU. DMACs are named DMAC1 and DMAC2. DMAC1 is a 8 bit byte memory transfer and DMAC2 is a 16 bit word transfer. The page register is used to extend it's physical address to 24 bit, because DMACs are generating only a 16 bit address.

1.1.9. Interrupt Controller

In the PU, there are two 8259 compatible interrupt controllers (INTC1 and INTC2). INTC1 is configured internal as a master controller and INTC2 as a slave. Total 16 levels of interrupts are provided. INTC1 is assigned to the I/O address 020H and 021H and INTC2 to 0A0H and 0A1H. The interrupt signals assignment is PC/AT compatible.

1.1.10. Timer

There are three 16-bit programmable timer/counters in the PU. They are functionally compatible to the 8254. The I/O address 040H to 043H is assigned to them. These timer/counters are compatible to the PC/AT.

1.1.11. Real Time Clock (RTC)

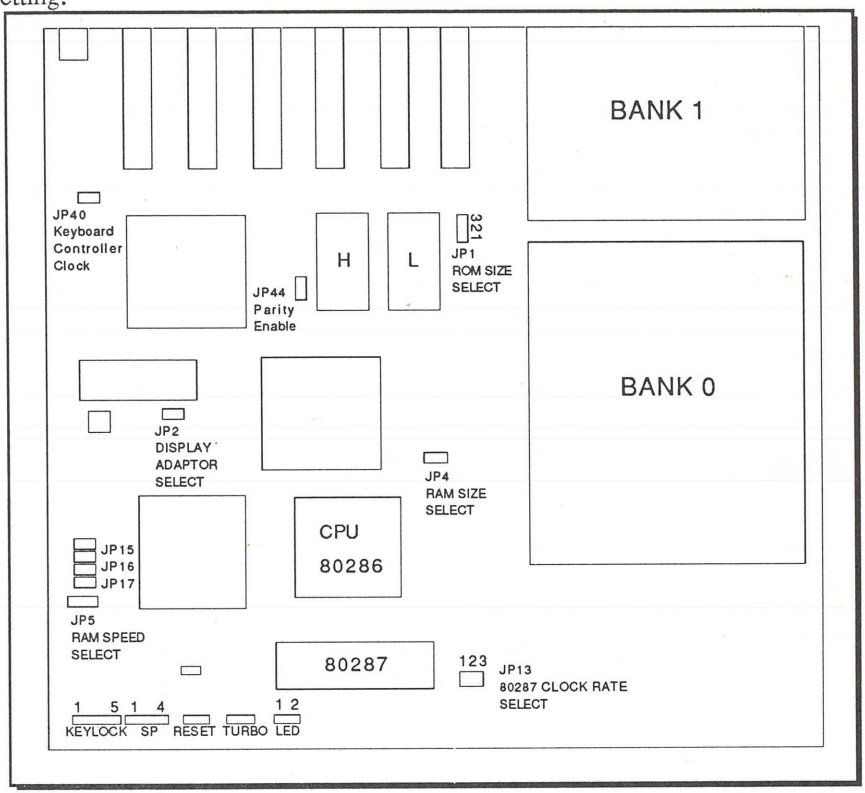
The internal real time clock is MC146818 compatible and has a calendar clock and a 64 byte static RAM. The RTC is backed-up by a battery, and be operated continuously during the system power is lost. There are given two I/O address locations to the RTC, 070H for the address data of the internal RAM and 071H for the data access.

1.1.12. Miscellaneous

The CPU clock frequency can be switched from 12 MHz to 8 MHz or vice versa by a TURBO switch or by keyboard. When CPU is working at high frequency the TURBO LED will be lighted. After power on the clock frequency can be chosen either as high or low by BIOS setup. Connectors for RESET switch, keyboard lock and SPEAKER are also provided.

2. Jumper Settings

The setting of the various jumpers are described as follows. The '*' indicates the factory setting.



The above diagram shows the lower portion of the mother board.

2.1. ROM type (JP1)

Both 128K bit EPROM (27128 or Equivalent) and 256K bit EPROM (27256 or equivalent) can be used for U55 and U56 to store the BIOS. The type of ROM is determined by the setting of JP1. It is described as follows.

ROM type	JP1
27128 or equivalent	1-2
27256 or equivalent	2-3

2.2. RAM type (JP4)

(SEE SECTION 3 FOR DETAILS)

DRAM type	JP4
41256, 44256 or equivalent	CLOSED
511000 or equivalent	OPEN

2.3. Display adapter type (JP2)

The jumper JP2 is used to signify the system which display adapter is currently used.

Adapter type	JP2
CGA, EGA or VGA etc.	CLOSED*
Monochrome adapter	OPEN

2.4. 80287 co-processor clock frequency (JP13)

The 80287 co-processor clock frequency can be selected by setting the JP13. The user is required to set JP13 according to the 80287 part number.

80287 part number	Clock frequency	JP13
80287-8 or higher	8 MHz	1-2*
80287-6	<6 MHz	2-3

2.5. EALE (Early Address Latch Enable) selection (JP16)

If this option is enabled, the BALE goes immediately active after the HIGH to LOW transition of S0Z or S1Z, i.e. at the beginning of TS (the status cycle). Otherwise the timing is similar to 80288 bus controller, i.e. BALE goes active at the middle of TS. If you find some adapter which does not work properly, you may change the setting of JP16 as CLOSED.

EALE	JP16
ENABLE	OPEN*
DISABLE	CLOSED

2.6. I/O wait state setting (JP15)

The Dynamic Clock Switching technique employed can adapt most existing add-in cards. However, for some very slow adapter additional wait state can be inserted by setting the JP15.

I/O wait state		JP15
8 BIT	16 BIT	
4	1	CLOSED*
6	2	OPEN

2.7. RAM speed selection (JP5)

This Jumper has been set according to the RAM speed and the CPU clock frequency. For instance, in 12MHz mode, 2-3 is closed.

2.8. Parity check enable/disable (JP44)

The JP44 is used to enable or disable parity check.

Parity check	JP44
Enable	OPEN*
Disable	CLOSED

If you don't install the parity chip on the board, you have to set JP44 as closed to disable parity check.

If JP44 is open, the parity check can also be controlled by software. Writing a zero to bit 2 of the I/O address H'061 enables parity and a one disables it.

JP44 may not present on some board and parity check should be controlled by software as described above.

2.9. Memory wait state setting (JP17)

Memory wait state	JP17
0	CLOSED*
1	OPEN

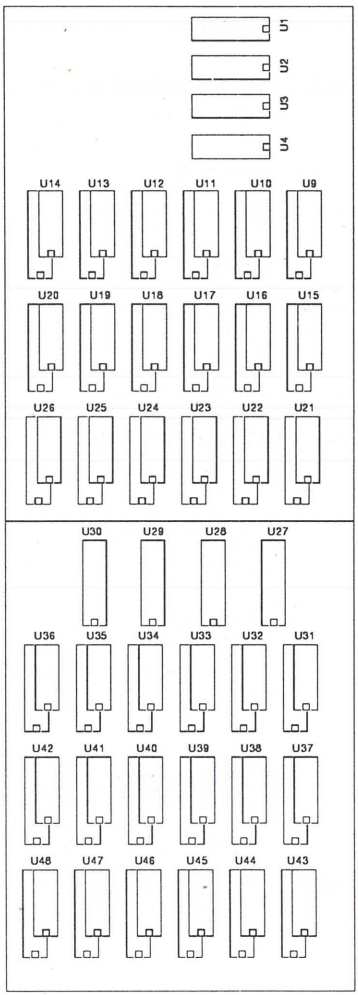
2.10. Keyboard controller clock frequency (JP40)

In order to adapt different keyboard, the keyboard controller clock frequency can be set as 8MHz or 4MHz by JP40.

Keyboard controller clock	
8MHz	CLOSED*
4MHz	OPEN

3. Memory Configuration and Installation

3.1. The memory layout



BANK 1

BANK 0

The board has one jumper identified as JP4; which determines the maximum memory size and type of memory chips used on the system board. User can configure from 0K to 4MB memory by setting the JP4 and properly inserting the DRAM chips into the appropriate sockets.

3.2. The memory configuration

The details of on board memory configuration and the jumper setting are described below :

Memory on board	Setting (JP4)	Bank	RAM Location & Type of memory chips	Base Memory	Extended Memory
0K	Don't Care			0K	0K
512K	Close	0	41256(U31-U48)	512K	0K
		0	414256(U27-U30) + 41256(U31,U37)	512K	0K
640K	Close	0	41256(U31-U48)	640K	0K
		1	4164(U9-U26)		
		0	414256(U27-U30) + 41256(U31,U37)		
		1	4164(U9-U26)		
1M	Close	0	41256(U31-U48)	640K	384K
		1	41256(U9-U26)		
		0	414256(U27-U30) + 41256(U31,U37)		
		1	414256(U1-U4) + 41256(U9,U15)		
		0	41256(U31-U48)		
		1	414256(U1-U4) + 41256(U9,U15)		
		0	414256(U27-U30) + 41256(U31,U37)		
		1	41256(U9-U26)		
2M	Open	0	511000(U31-U48)	640K	1408K
2.128M	Open	0	511000(U31-U48)	640K	1536K
		1	4164(U9-U26)		

2.5M	Open	0 1	511000(U31-U48) 41256(U9-U26)	640K	1920K
		0 1	511000(U31-U48) 414256(U1-U4) + 41256(U9,U15)		
4M	Open	0 1	511000(U31-U48) 511000(U9-U26)	640K	3456K

4. Connectors

4.1. TURBO LED connector

1	LED CATHODE
2	LED ANODE

4.2. RESET connector

Pin number	Function
1, 2	NORMAL OPEN

Closed once reset the system.

4.3. TURBO connector

Pin number	Function
1, 2	OPEN (HIGH SPEED 12MHZ)
	CLOSE (LOW SPEED 8MHZ)

If closed, software speed selection is disabled.

4.4. Speaker connector

Pin number	Function
1	SPEAKER (-)
2	GND
3	KEY
4	SPEAKER (+5V)

4.5. Keylock and power LED connector

Pin number	Function
1	+5V
2	NC
3	GND
4	KEYBOARD INHIBIT
5	GND

4.6. Keyboard connector

Pin number	Function
1	CLOCK
2	DATA
3	NC
4	GND
5	+5V*

* The +5V connected to the keyboard connector is via a 2.5A PICO fuse for protection.

4.7. Power connector 1

Pin number	Function
1	POWER GOOD
2	+5V
3	+12V
4	-12V
5	GND
6	GND
7	GND
8	GND
9	-5V
10	+5V
11	+5V
12	+5V

4.8. Expansion slots

4.8.1. 62 pin card-edge socket pin assignment (P3 - P9)

I/O Pin	Signal Name	I/O	I/O Pin	Signal Name	I/O
A1	-I/O CHCK	I	B1	GND	Ground
A2	SD7	I/O	B2	RESET	O
A3	SD6	I/O	B3	+5 Vdc	Power
A4	SD5	I/O	B4	IRQ9	I
A5	SD4	I/O	B5	-5 Vdc	Power
A6	SD3	I/O	B6	DRQ2	I
A7	SD2	I/O	B7	-12 Vdc	Power
A8	SD1	I/O	B8	0WS	I
A9	SD0	I/O	B9	+12 Vdc	Power
A10	-I/O CHRDY	I	B10	GND	Ground
A11	AEN	O	B11	-SMEMW	O
A12	SA19	I/O	B12	-SMEMR	O
A13	SA18	I/O	B13	-IOW	I/O
A14	SA17	I/O	B14	-IOR	I/O

A15	SA16	I/O	B15	-DACK3	O
A16	SA15	I/O	B16	DRQ3	I
A17	SA14	I/O	B17	-DACK1	O
A18	SA13	I/O	B18	DRQ1	I
A19	SA12	I/O	B19	-REFRESH	I/O
A20	SA11	I/O	B20	CLK (8 MHz)	O
A21	SA10	I/O	B21	IRQ7	I
A22	SA9	I/O	B22	IRQ6	I
A23	SA8	I/O	B23	IRQ5	I
A24	SA7	I/O	B24	IRQ4	I
A25	SA6	I/O	B25	IRQ3	I
A26	SA5	I/O	B26	-DACK2	O
A27	SA4	I/O	B27	TC	O
A28	SA3	I/O	B28	BALE	O
A29	SA2	I/O	B29	+5 Vdc	Power
A30	SA1	I/O	B30	OSC(14.3 MHz)	O
A31	SA0	I/O	B31	GND	Ground

4.8.2. 36 pin card-edge socket pin assignment (P3 - P8)

I/O Pin	Signal Name	I/O	I/O Pin	Signal Name	I/O
C1	SBHE	I/O	D1	-MEMCS16	I
C2	LA23	I/O	D2	-I/OCS16	I
C3	LA22	I/O	D3	IRQ10	I
C4	LA21	I/O	D4	IRQ11	I
C5	LA20	I/O	D5	IRQ12	I
C6	LA19	I/O	D6	IRQ13	I
C7	LA18	I/O	D7	IRQ14	I
C8	LA17	I/O	D8	-DACK0	O
C9	-MEMR	I/O	D9	DRQ0	I
C10	-MEMW	I/O	D10	-DACK5	O
C11	SD08	I/O	D11	DRQ5	I
C12	SD09	I/O	D12	-DACK6	O
C13	SD10	I/O	D13	DRQ6	I
C14	SD11	I/O	D14	-DACK7	O

C15	SD12	I/O	D15	DRQ7	I
C16	SD13	I/O	D16	+5 Vdc	Power
C17	SD14	I/O	D17	-MASTER	I
C18	SD15	I/O	D18	GND	Ground

5. Phoenix BIOS setup procedures

80286 ROM BIOS PLUS SETUP allows users to easily configure their systems. Using the SETUP menus, users enter configuration information for :

- time, day and date
- diskette and fixed disk characteristics
- video display data
- system memory organization information
- initial CPU speed setting data, and
- keyboard data

SETUP is part of the ROM BIOS and stores the system configuration data in CMOS memory. It is used to modify certain basic characteristics of system configuration. During the boot up stage, the CMOS setup function can be activated by pressing <CTRL><ALT><S> on the keyboard.

Following is the SETUP screen:

Phoenix Technologies Ltd. Version
System Configuration Setup 4.03 01

Time : 23:46:50
Date : Thu Mar 08, 1990

		Cyl	Hd	Pre	LZ	Sec	Size
Diskette A :	5.25 Inch, 1.2MB						
Diskette B :	Not Installed						
Hard Disk 1 :	Type 2	615	4	300	615	17	20
Hard Disk 2 :	Not Installed						
Base Memory :	640 KB						
Extended Memory :	384 KB						
Display :	VGA/EGA						
Keyboard :	Installed						
CPU Speed :	Fast						
Coprocessor :	80287						

Up/Down Arrow to select. Left/Right Arrow to change.
F1 for help. F10 to Exit. Esc to reboot.

The up and down arrow keys on the numeric keypad move from one field to another (for example, from Diskette A : to Diskette B :). The value in a field when done will be used by SETUP to configure the appropriate feature of subsystem.

The left and right arrows on the numeric keypad change a setting. If the entry is changed to an incorrect option, the opposite arrow key changes it back to the correct value.

<F1> display an explanatory message for each field, if help is enabled and recogrized by SETUP.

<F10> exits SETUP and returns to the operating system without rebooting. The changes indicated will have been made in CMOS, but will not affect the system until the next system reboot, with the exception of time and data changes, which take effect immediately.

<ESC> to reboot the system, causing all of the changes made to the system configuration to take effect immediately.

5.1. Setting the Time

SETUP begins by highlighting the hour field of the Time line. The right arrow key advances the hour setting; the left arrow key moves the setting backwards. The down arrow key saves the hour setting and highlights the minute field. The minute and second field are set and saved in the same manner as the hour field. The down arrow key advances to the Date line.

5.2. Setting the Date

The right and left arrows select the correct month, date, and year. The day cannot be highlighted but is set automatically when the date is set.

The time and date will be maintained and updated by the Real Time Clock in the system, even when the system is off.

5.3. Configuring diskettes

Up to five diskette drive type options may appear :

- 5.25 Inch, 1.2 MB,
- 5.25 Inch, 360K,
- 3.5 Inch, 1.44 MB,
- 3.5 Inch, 720K or
- Not Installed.

Left and right arrow keys scroll through the avaliable selections. If users need to configure a 160K, 180K, or 320K drive, they can specify the 5.25 Inch, 360K option. 720K 5.25 Inch diskette drives are supported by the BIOS for read/write commands but not for the format command.

5.4. Configuring a diskless workstation

If Diskette A is set as Not Installed and the BIOS and SETUP are configured to suppress diskette error meesages, the BIOS will not display an error message if it finds drive A missing. This makes it possible to configure and operate a system with no diskette drives installed. If Not Installed is selected but there is a diskette drive in slot A, the diskette drive will still operate properly.

Pressing the down arrow key highlights the Diskette B line. The process to configure drive B is the same as drive A. If the system does not have a second diskette drive, configure the Diskette B line as Not Installed.

NOTE: Configuring the drives improperly causes diskette operation to fail.

5.5. External diskettes

Phoenix ROM BIOS PLUS supports configuration of up to two external diskette drives. These can be either 360K or 1.2MB 5.25 Inch diskette drives or 720K or 1.44 MB 3.5 Inch diskette drives. Configuring external diskettes does not involve SETUP.

5.6. Configuring hard disk 1

If the fixed disk information is not on the help screens, the following specifications are needed in order to configure it :

- number of cylinders,
- number of heads,
- write precompensation,
- landing zone, and
- number of sectors.

Where to find drive specifications

The following is a partial list of potential sources for drive specifications :

- the manufacturer's report that was shipped with the computer or fixed disk drive,
- the information printed on the disk drive label, or
- the documentation provided with the drive.

If no information is available, users can call the manufacturer of the computer or fixed disk drive.

Table 1. The Fixed Disk Drive Table for the Phoenix 80286 ROM BIOS PLUS

TYPE	CYLINDERS	HEADS	WRITE PRECOMP	LANDING ZONE	SECTORS	SIZE
1	306	4	128	305	17	10
2	615	4	300	615	17	20
3	615	6	300	615	17	30
4	940	8	512	940	17	62
5	940	6	512	940	17	46
6	615	4	-1	615	17	20
7	462	8	256	511	17	30
8	733	5	-1	733	17	30
9	900	15	-1	901	17	112
10	820	3	-1	820	17	20
11	855	5	-1	855	17	35
12	855	7	-1	855	17	49
13	306	8	128	319	17	20
14	733	7	-1	733	17	42
15			Reserved			
16	612	4	0	663	17	20
17	997	5	300	997	17	40
18	997	7	-1	997	17	56
19	1024	7	512	1023	17	59
20	733	5	300	732	17	30
21	733	7	300	732	17	42
22	733	5	300	733	17	30
23	306	4	0	336	17	10
24			Drive Table Entry Unused			
25	615	4	0	615	17	20
26	1024	4	-1	1023	17	34
27	1024	5	-1	1023	17	42
28	1024	8	-1	1023	17	68
29	512	8	256	512	17	34
30	615	2	615	615	17	10
31	989	5	0	989	17	41
32	1020	15	-1	1024	17	127

TYPE	CYLINDERS	HEADS	WRITE PRECOMP	LANDING ZONE	SECTORS	SIZE
33			Drive Table Entry Unused			
34			Drive Table Entry Unused			
35	1024	9	1024	1024	17	76
36	1024	5	512	1024	17	42
37	830	10	-1	830	17	68
38	823	10	256	824	17	68
39	615	4	128	664	17	20
40	615	8	128	664	17	40
41	917	15	-1	918	17	114
42	1023	15	-1	1024	17	127
43	823	10	512	823	17	68
44	820	6	-1	820	17	40
45	1024	8	-1	1024	17	68
46	925	9	-1	925	17	69
47	699	7	256	700	17	40
48			User Definable			
49			User Definable			

Standard IBM drives have 17 sectors per track. All other drives have more (22, 26, 34 and so on) because of data compression technique used by the controller. If your system contains a drive with characteristics not listed in the above drive table then you must have a special driver for it (to be loaded at boot time as listed in CONFIG.SYS). In such a case, select the drive type recommended by the drive manufacturer or Not Installed if there no drive number is assigned.

5.7. Configuring hard disk 2

Drive 2 is configured using the same process as drive 1. If the system does not have another hard drive, users enter drive 2 as Not Installed.

5.8. Configuring Base Memory

The correct value for Base Memory is usually displayed on the SETUP screen. If users need to change this value they should use the numeric keys on the keyboard to type in the correct amount of RAM installed on the system board. For 286 system board the value could be 512 if you have only installed 512 KB RAM, or 640 if you have installed more than 512 KB RAM (640KB, 1MB, 2MB, 2.128MB, 2.5MB or 4MB).

5.9. Configuring Extended Memory

EXTENDED MEMORY is the memory beyond the 1 Megabyte. It is utilized by multi-user and/or multi-tasking operating systems. In DOS environment it may be used as Expanded Memory with the EMS driver or as DISK CACHE, VDISK with the corresponding drivers .

To set the value enter the amount of memory, in kilobytes, using the numeric keys on your keyboard. For 286 system board the value could be as follows.

Total Memory Installed	Base Memory	Extended Memory
512 KB	512 KB	0
640 KB	640KB	0
1 MB	640 KB	384 KB
2 MB	640 KB	1408 KB
2.128 MB	640 KB	1536 KB
2.5 MB	640 KB	1920 KB
4 MB	640 KB	3456 KB

5.10. Configuring display

In most cases the correct video display value appears on this line. Users may scroll through the settings with the right and left arrow keys. The settings are :

- MONO (Monochrome Display Adapter),
- VGA/EGA (EGA or VGA color or monochrome display adapter),
- CGA40 (40-column CGA display adapter),
- CGA80 (80-column CGA display adapter), or
- Not Installed.

Users should consult the system manual if they aren't sure of this value. If Not Installed is selected and the BIOS and SETUP are configured to suppress display error messages, the BIOS will not report an error if it finds the display missing when the system boots. If Not Installed is selected and the system has a display, it still operates properly.

5.11. Configuring keyboard

The Not Installed option configures a system without a keyboard. If Not Installed is selected and the BIOS and SETUP are configured to suppress keyboard error messages, the BIOS will not display an error message if it finds the keyboard missing at system startup. If a keyboard is connected, but Not Installed is selected, the keyboard will still operate.

5.12. Setting CPU speed

Users can change the CPU speed at any time. Older software that runs under a copy protection scheme may require a slower speed for proper operation. Pressing a three-key combination, as the ones that follow, changes the CPU speed:

<Ctrl> <Alt> <+> = high speed
<Ctrl> <Alt> <-> = low speed

The Math Coprocessor

The Math Coprocessor line cannot be configured. It only reports whether or not the math coprocessor is installed. If no math coprocessor came with the system but is added later, the coprocessor option will display installed.

Review SETUP Screen

Verify that all settings are correct. Users can press <F10> to get out of SETUP and into the operating system. The configuration changes specified have been made in CMOS RAM and will take effect when the system is rebooted.

6. **Award BIOS setup procedures**

   This BIOS supports ROM BASED CMOS SETUP function. During system boot up you may configure the system by pressing <Ctrl><Alt><Esc> on the keyboard.

Following is the SETUP screen:

```
AWARD SOFTWARE CMOS SETUP

DATE (MM/DD/YY)          01/01/80
TIME (HH:MM:SS)          00:00:00

DISKETTE 1               NONE
DISKETTE 2               NONE

DISK 1                   NONE
DISK 2                   NONE

VIDEO                    EGA

BASE MEMORY              0
EXTENDED MEMORY          0

ERROR HALT               HALT ON ALL ERRORS
SPEED SELECT             NO CHANGE

<UP ARROW>, <DOWN ARROW>, <Enter> MOVE BETWEEN ITEMS,
<LEFT ARROW>, <RIGHT ARROW> SELECTS VALUES
F10 RECORDS CHANGES, F1 EXITS, F2 FOR COLOR TOGGLE
```

A reverse video cursor will move vertically between items when you press the <UP ARROW>, <DOWN ARROW> or <Enter> key. You may change the value in the individual fields as they are highlighted.

Pressing the <F10> key stores any changes made to the CMOS RAM. You will be asked to press <F5> key to confirm changes before they are written to CMOS RAM.

Pressing <F1> key will allow you to exit from SETUP without making any changes.

Pressing <F2> key will change the video output from color to monochrome or vice versa.

6.1. DATE

When the video reverse cursor is located at the DATE field, type the current date into this position and press <Enter> key. The date is in MONTH/DATE/YEAR format and the century is assumed to be 1900. Use backspace key to correct typing mistakes when necessary.

After the date has been set press the <UP ARROW> or <DOWN ARROW> keys to move the video reverse cursor to another field, or press <F10> key to record change, or press <F1> key to exit.

6.2. TIME

Similarly, when the highlight cursor is located at the TIME field, type in the current time in HOUR:MINUTE:SECONDS format. The HOUR is calculated according to the 24-hour clock. Leading zero can be omitted as well as the value of SECONDS.

After the time has been set you may proceed just like you have set the DATE.

6.3. DISKETTE 1

There are five choices available for the "A" drive, they are as follows:

1. NONE (No floppy drive)
2. 360K (5.25" PC-Type standard drive)
3. 1.2M (5.25" AT-Type quad-density drive)
4. 720K (3.5" single sided drive)
5. 1.4M (3.5" double sided drive)

When the DISKETTE 1 field is highlighted, pressing the <RIGHT ARROW> or <LEFT ARROW> changes the highlighted value from 1 to 5 or vice versa. After making the changes you may proceed as described in 6.1.

6.4. DISKETTE 2

The procedure for selecting DISKETTE 2 is exactly the same as described in 6.3.

6.5. DISK 1

There are 44 types of hard disk drives supported in the SETUP program. They are listed below :

Table 2. The Fixed Disk Drive Table for the AWARD 3.04 BIOS

TYPE	CYLINDERS	HEADS	WRITE PRECOMP	LANDING ZONE	SECTORS	SIZE
1	306	4	128	305	17	10
2	615	4	300	615	17	20
3	615	6	300	615	17	30
4	940	8	512	940	17	62
5	940	6	512	940	17	46
6	615	4	None	615	17	20
7	462	8	256	511	17	30
8	733	5	None	733	17	30
9	900	15	None	901	17	112
10	820	3	None	820	17	20
11	855	5	None	855	17	35
12	855	7	None	855	17	49
13	306	8	128	319	17	20
14	733	7	0	733	17	42
15			Reserved			
16	612	4	0	663	17	20
17	997	5	300	997	17	40
18	997	7	None	997	17	56
19	1024	7	512	1023	17	59
20	733	5	300	732	17	30
21	733	7	300	732	17	42
22	733	5	300	733	17	30
23	306	4	None	336	17	10
24	977	5	None	976	17	40
25	1024	9	None	1023	17	76
26	1224	7	None	1223	17	71
27	1224	11	None	1223	17	111
28	1224	15	None	1223	17	152

TYPE	CYLINDERS	HEADS	WRITE PRECOMP	LANDING ZONE	SECTORS	SIZE
29	1024	8	None	1023	17	68
30	1024	11	None	1023	17	93
31	918	11	None	1023	17	83
32	925	9	None	926	17	69
33	1024	10	None	1023	17	85
34	1024	12	None	1023	17	102
35	1024	13	None	1023	17	110
36	1024	14	None	1023	17	119
37	1024	2	None	1023	17	17
38	1024	16	None	1023	17	136
39	918	15	None	1023	17	114
40	820	6	None	820	17	40
41	1024	5	512	1023	17	42
42	809	6	128	852	26	61
43	809	6	128	808	17	40
44	776	8	None	775	33	100
45-47			Reserved			

Press the <RIGHT ARROW> key to select a higher numbered disk type. Press the <LEFT ARROW> to select a lower numbered disk type. You may also directly enter the disk type using the numeric keys. NONE can be selected by using the arrow keys to display selections until the word NONE is displayed in the highlighted field or by entering 0.

Standard IBM drives have 17 sectors per track. All other drives have more (22, 26, 34 and so on) because of data compression technique used by the controller. If your system contains a drive with characteristics not listed in the above drive table then you must have a special driver for it (to be loaded at boot time as listed in CONFIG.SYS). In such a case, select the drive type recommended by the drive manufacturer or NONE if there no drive number is assigned.

6.6. DISK 2

The procedure for selecting DISK 2 is exactly the same as described in 6.5 above.

6.7. VIDEO

There are four choices available:

1. EGA (Enhanced Graphics Adapter or any special video adapter)
2. 40 Color (Color Adapter, power up in 40 column mode)
3. 80 Color (Color Adapter, power up in 80 column mode)
4. MONO (Monochrome Adapter)

The text in the parentheses do not appear on the SETUP screen.

Pressing <LEFT ARROW> or <RIGHT ARROW> can change the value displayed in ascending order or descending order respectively.

To specify a VGA, PGA or other special video adapter choose 1. EGA.

There is no selection for secondary video adapter in the SETUP program. A video adapter must be specified and installed for the system to boot normally even though the monitor need not be installed. After the video adapter has been changed you may proceed as described in 6.1 above.

6.8. BASE MEMORY

BASE MEMORY is the amount of contiguous memory from address space 0 up to 9FFFFH, in which the DOS application programs are loaded and executed. Address space from A0000H to FFFFFH is dedicated for use by the system software, such as ROM BIOS, various adapters and EMS drivers etc.

To set this value enter the amount of memory in kilobytes, using the numeric keys on your keyboard. For system board the value could be 512 if you have only installed 512 KB RAM, or 640 if you have installed more than 512 KB RAM (640KB, 1MB, 2MB, 2.128MB, 2.5MB or 4MB).

At power up the computer determine how much memory is present. If the value entered in this field is different from the value found by the computer at power up a prompt will ask for confirmation that the correct value that has been entered. Press the <F5> key if you are sure the correct number has been entered. Press any key but <F5> to restore the previous base memory value.

6.9. AMOUNT OF EXTENDED MEMORY

EXTENDED MEMORY is the memory beyond the 1 Megabyte. It is utilized by multi-user and/or multi-tasking operating systems. In DOS environment it may be used as Expanded Memory with the EMS driver or as DISK CACHE, VDISK with the corresponding drivers .

To set the value enter the amount of memory, in kilobytes, using the numeric keys on your keyboard. For system board the value could be as follows.

Total Memory Installed	Base Memory	Extended Memory
512 KB	512 KB	0
640 KB	640 KB	0
1 MB	640 KB	384 KB
2 MB	640 KB	1408 KB
2.128 MB	640 KB	1536 KB
2.5 MB	640 KB	1920 KB
4 MB	640 KB	3456 KB

At power up the computer determines how much memory is present. If the value entered in this field is different from the value found by the computer at power up a prompt will ask for confirmation that the correct value that has been entered. Press the <F5> key if you are sure the correct number has been entered. Press any key but <F5> to restore the previous base memory value.

6.10. ERROR HALT

This setting determines if the computer will stop when an error is detected during power up. There are five choices:

1. HALT ON ALL ERRORS.
2. DON'T HALT ON ANY ERRORS.
3. DON'T HALT ON KEYBOARD ERRORS, BUT HALT ON ALL OTHERS.
4. DON'T HALT ON DISK ERRORS, BUT HALT ON ALL OTHERS.
5. DON'T HALT ON KEYBOARD OR DISK ERRORS, BUT HALT ON ALL OTHERS.

For most situations choice 1 "Halt on all errors" should be used. A system halt may prevent loss of data (as is common when a fixed disk or RAM malfunctions). For some special applications, however, the computer should not halt. For example, system tied to local area networks do not need disk drives if they can boot from the file server. The system should not halt if it fails to detect any disk drives. Also, computers that are employed in multi-user systems as file servers might not use a keyboard and should not halt when a keyboard error is detected. Choices 2 thru 5 will prevent this halt being executed.

Pressing <LEFT ARROW> or <RIGHT ARROW> keys to change the displayed selection in ascending order or descending order. After the halt condition has been changed you may proceed as described in 6.1.

6.11. SPEED SELECT

If the TURBO switch is opened (NORMAL), the speed can be set as HIGH or LOW. On the other hand, if the TURBO switch is closed, the speed is low, and not to be changed by software.

6.12. SETUP PROGRAM DEFAULT SETTING

The following values are the default setting provided with the SETUP program written by Award Software, INC.

DATE	1/1/80
TIME	00:00:00
DISKETTE 1	NONE
DISKETTE 2	NONE
DISK 1	NONE
DISK 2	NONE
VIDEO	EGA
BASE MEMORY	AMOUNT FOUND BY POST
EXTENDED MEMORY	AMOUNT FOUND BY POST
ERROR HALT	HALT ON ALL ERRORS
SPEED CHANGE	NO CHANGE

7. Appendices

7.1. Installation of Award Modular BIOS ROMed Disk Caching Extension

The Award Modular BIOS ROMed Disk Caching Extension, which is also refered to as the Disk Wizard, is an option of the Main Board. It can significantly increase the disk access speed.

The installation procedures are described below. Please refer to the Disk Caching Extension User's Manual for details.

1. Make a subdirectory 'CACHE' by typing MD \CACHE ;

2. Change directory to CACHE by typing CD \CACHE ;

3. Press 'SHIFT' 'CTRL' 'ALT' 'NUM LOCK' simultaneously. A file called **WIZSETUP.COM** shall appear in the directory ;

4. Run the disk cache setup program by typing WIZSETUP ;

5. Set the options in the set up routine
   e.g. Amount and type of memory used for disk cache etc.

6. The setup program will update the **AUTOEXEC.BAT** file ;

7. Perform warm boot to complete the disk cache installation.